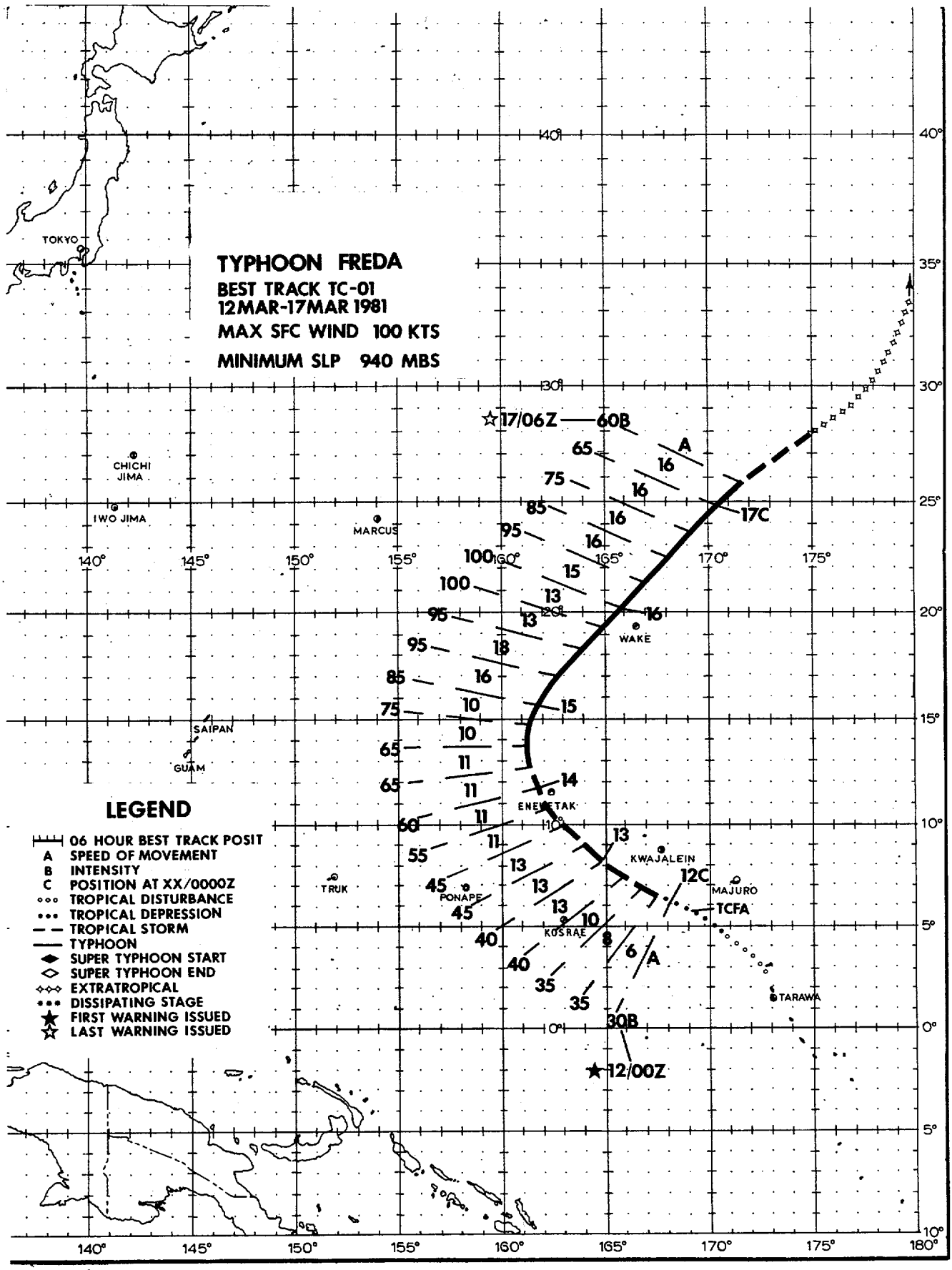
TYPHOON FREDA
BEST TRACK TC-01
12MAR-17MAR 1981
MAX SFC WIND 100 KTS
MINIMUM SLP 940 MBS
TOKYO
CHICHI JIMA
IWO JIMA
MARCUS
WAKE
SAIPAN
GUAM
ENEWETAK
KWAJALEIN
MAJURO
TARAWA
TRUK
PONAPE
KOSRAE
☆17/06Z
60B
17C
12C
TCFA
30B
★12/00Z
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED

Typhoon Freda, the first tropical cyclone of 1981 and only the fourth typhoon since 1959 to occur in March, developed very slowly within the near-equatorial trough that shifted briefly north of the equator in early March.

Remaining quasi-stationary near the Gilbert Islands just north of the equator for nearly three days, the disturbance finally began to move northwestward and developed slowly as it reached higher latitudes. Although the upper-level synoptic pattern with strong unindirectional southeast flow (Fig. 3-01-1) was unfavorable for development, noticeable improvement in the satellite signature led to the issuance of a Tropical Cyclone Formation Alert at 111900Z. The first warning on TD 01 was issued six hours later as the disturbance approached the southern Marshall Islands when synoptic reports and satellite imagery indicated further development.

Beginning with the first warning, JTWC forecasts were consistent in predicting recurvature west of Enewetak Atoll. This track was based on an apparent break in the mid-tropospheric subtropical ridge along 160E between the mid-Pacific high and a large high pressure cell over the Philippine Islands. This break was later confirmed by valuable synoptic data received from reconnaissance aircraft flying to and from the developing cyclone.

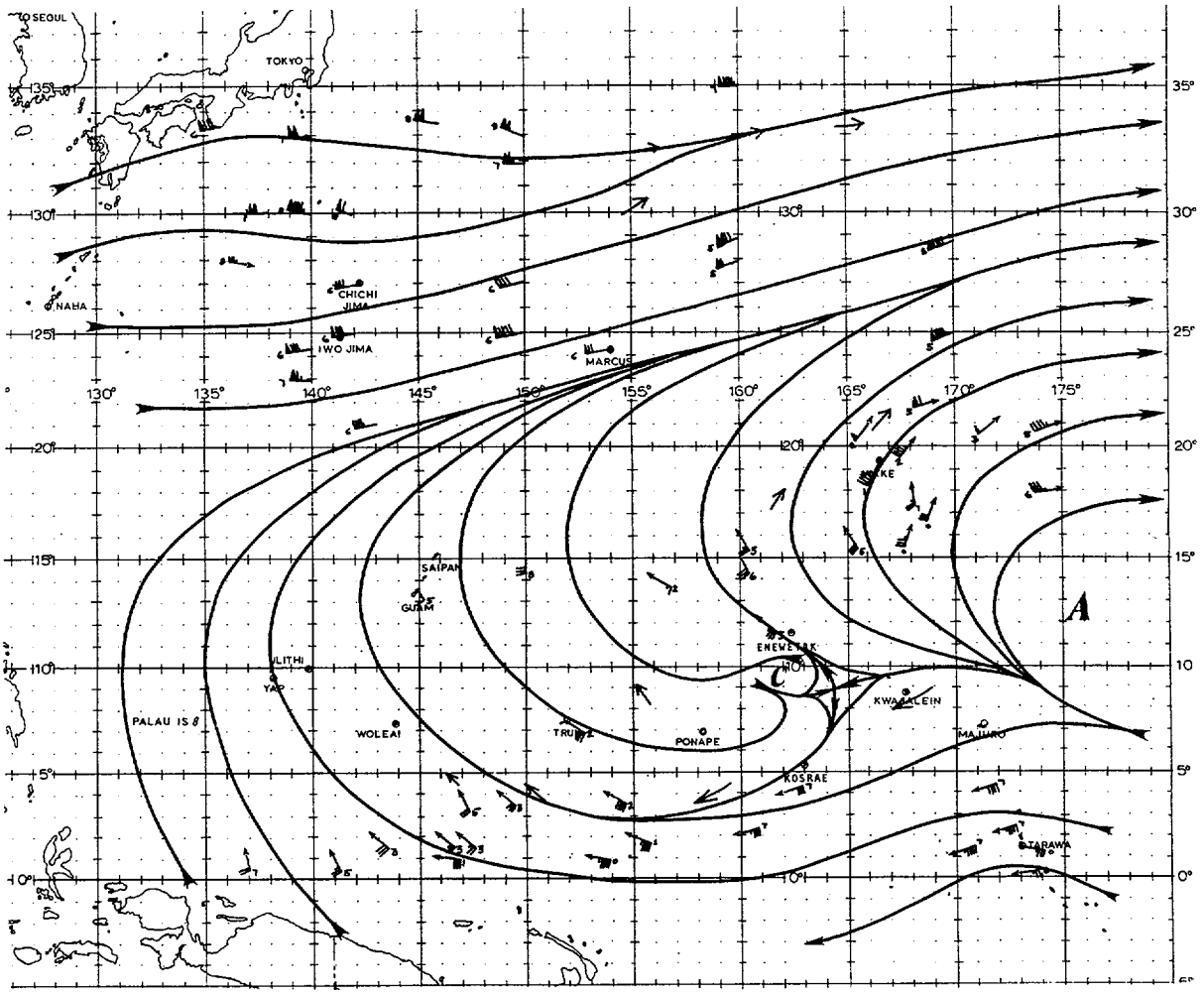

FIGURE 3-01-1. 200-mb streamline analysis at 131200Z. At this time, the flow pattern was still primarily associated with the mid-Pacific ridge with little indication of large-scale outflow over Freda at this level. Wind data are a combination of RAOBS, AIREPS, and satellite derived winds(⟵) and blow-off wind directions (⟵). Wind speeds are in knots.

The strong southeasterly flow aloft resulted in considerable vertical tilt during Freda's northwest track. The 700-mb center was consistently observed 15 to 25 nm (28 to 46 km) north-northwest of the surface center. This poor vertical alignment combined with the absence of strong upper-level outflow channels resulted in her extremely slow intensification. This proved fortunate for Enewetak Atoll which lay directly in Freda's path. Freda passed 15 nm (28 km) west of the Atoll with 55 kt (28 m/sec) sustained winds, considerably less than normal for a disturbance that had developed to tropical storm intensity 48 hours earlier. Although no synoptic observations or damage reports were received from Enewetak, the situation could have been far more disastrous.

In contrast to the extremely slow development during the first three days of her existence, Freda intensified rapidly once north of the ridge axis and in a more favorable upper-level environment (Fig. 3-01-2). Contact with the southwest-

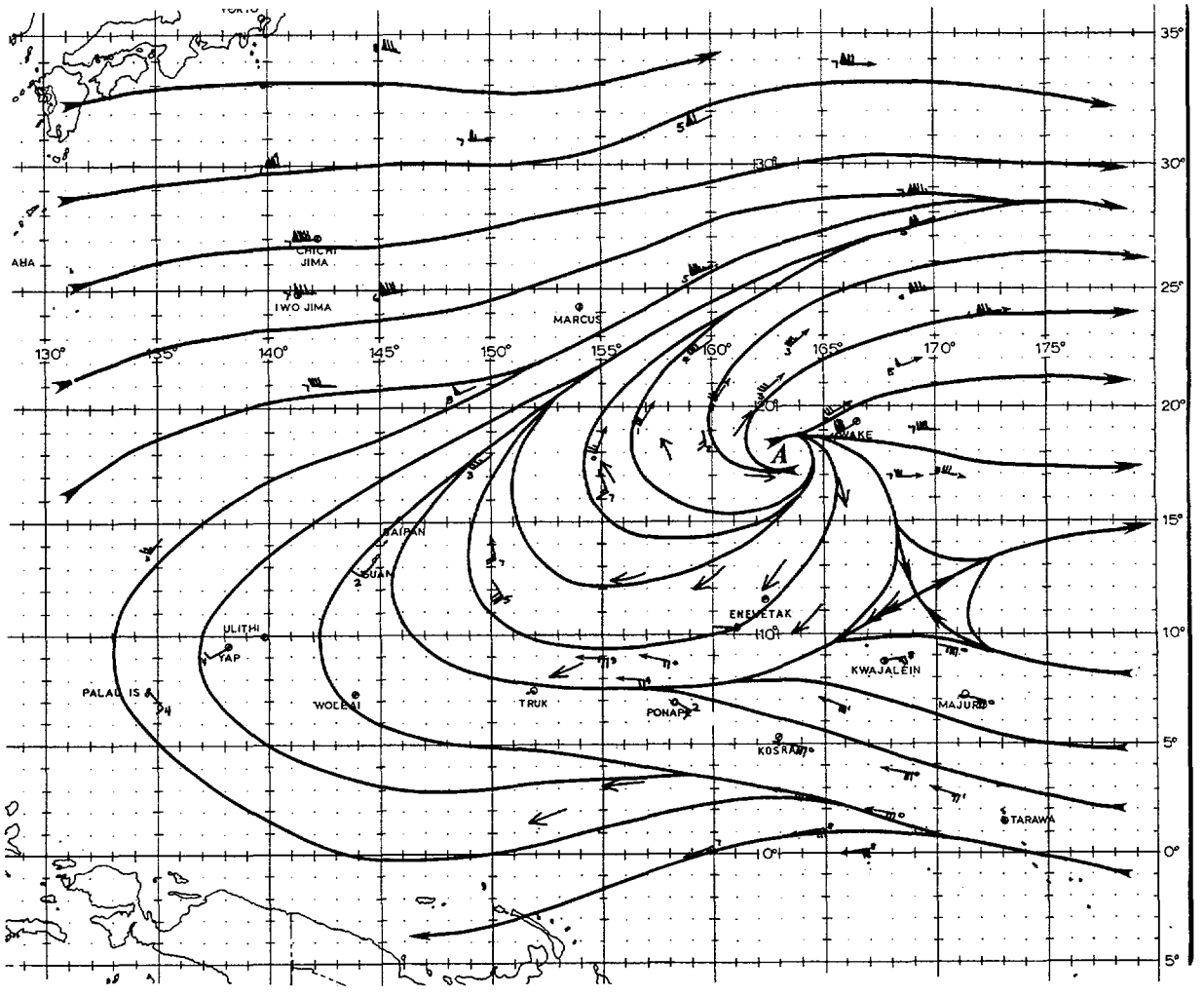

FIGURE 3-01-2. 200-mb streamline analysis at 150000Z depicting a dramatic change in the upper-level flow pattern with the outflow over Freda now the primary feature. The westerly jet has dipped as far south as 25N providing a vigorous outflow channel to the northeast for Freda. Wind data are a combination of RAOBS, AIREPS, and satellite derived winds (⟵) and blow-off wind directions (⟵). Wind speeds are in knots.

erly jet north of her provided a vigorous outflow channel to the north. With multiple outflow channels to the environmental flow, Freda intensified from 65 kt (33 m/sec) to 100 kt (51 m/sec) and deepened from 975 mb to 940 mb within 30 hours (Fig. 3-01-3).

Unlike Enewetak, Freda was at her maximum intensity of 100 kt (51 m/sec) when she passed within 65 nm (120 km) of Wake Island. Wake reported maximum sustained winds of 50 kt (26 m/sec) with gusts to 75 kt (39 m/sec) at 152300Z. Damage to the island's runway and support equipment was extensive, caused primarily by the high surf, estimated to be over 20 feet, generated by Freda's close passage.

As Freda moved further north and approached the core of the jetstream, the strong mid-latitude westerlies responsible for her rapid intensification also caused her eventual weakening. Forty-eight hours after reaching maximum intensity, Freda's convection was sheared off and the low-level circulation moved quickly northward and was absorbed into a developing extratropical low pressure system.

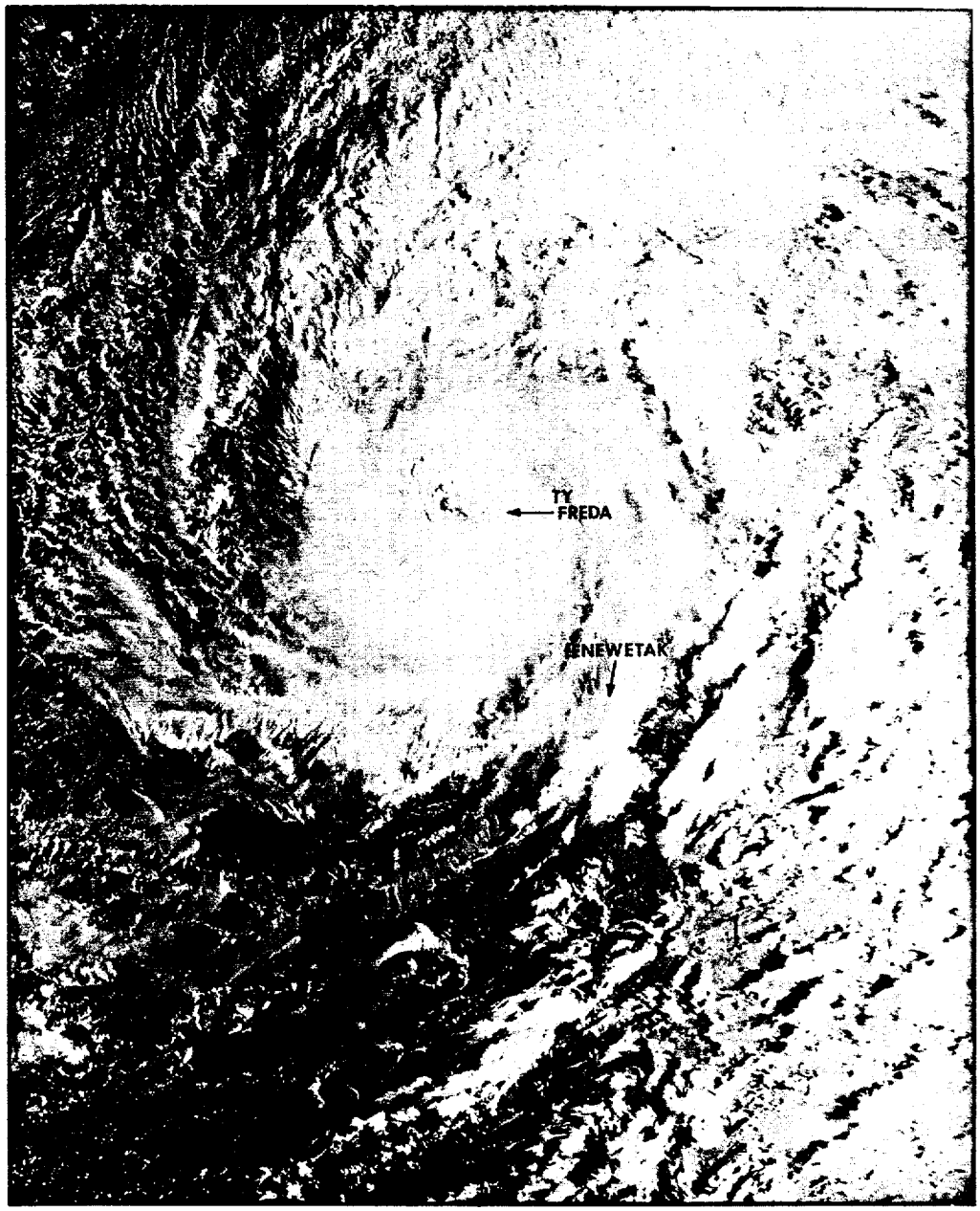

FIGURE 3-01-3. Typhoon Freda at 80-kt (41 m/sec) intensity 390 nm (722 km) southwest of Wake Island, 14 March 1981, 2120Z. (NOAA 6 visual imagery)